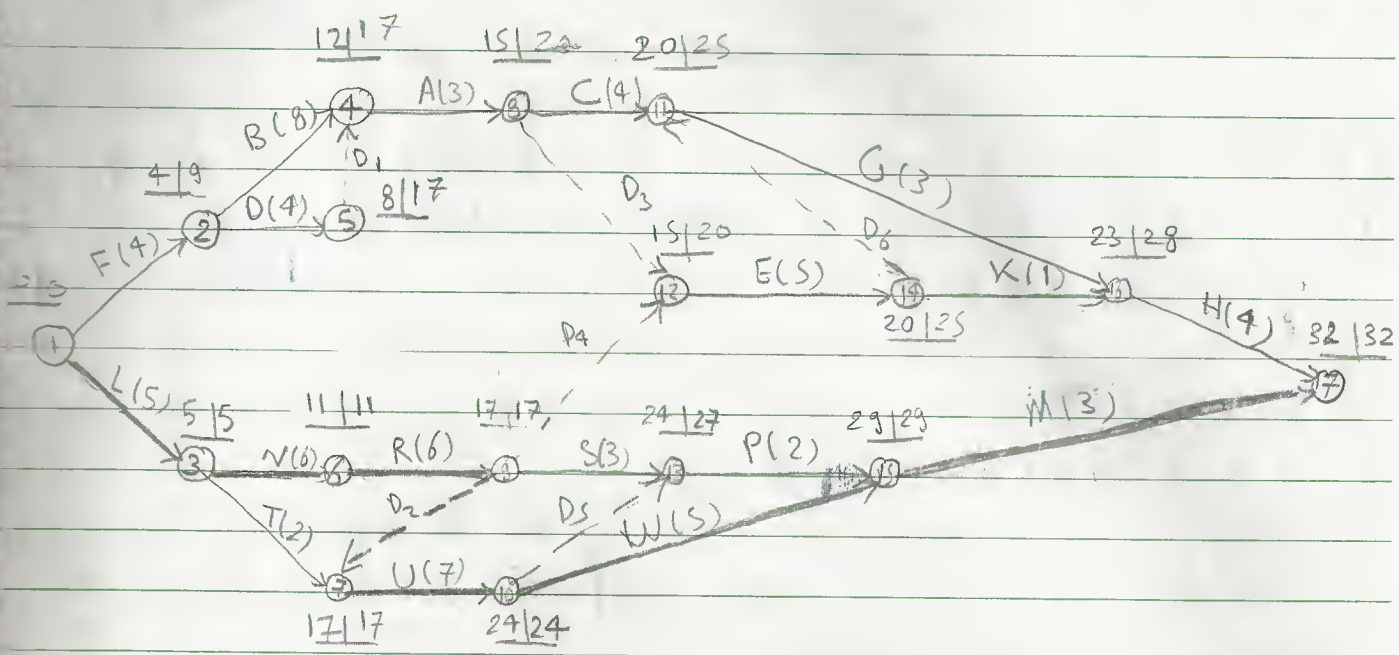
EL BEDA

Assignment (1)

1)

i)



Total completion time = 32 days, critical path:

Activity	Duration (days)	ES	LS	EF	LF	FF
A	3	12	17	15	20	0
B	8	4	9	12	17	0
C	4	15	21	19	25	3
D	4	4	13	8	17	0
E	5	15	20	20	25	0
F	4	0	5	4	9	0
G	3	20	25	23	28	0
H	4	23	28	27	32	3
K	1	20	27	21	28	2
L	5	0	0	5	5	0
M	3	29	29	32	32	0
N	6	5	5	11	11	0
P	2	24	27	26	29	3
R	6	11	11	17	17	0
S	3	17	24	20	27	4
T	2	5	15	7	17	10
U	7	17	17	24	24	0
W	5	24	24	29	29	0
D1	0	8	17	8	17	9
D2	0	17	17	17	17	0
D3	0	15	20	15	20	5
D4	0	12	17	12	17	5
D5	0	20	20	20	20	0
D6	0	23	28	23	28	5

Page :

Date :

(i)

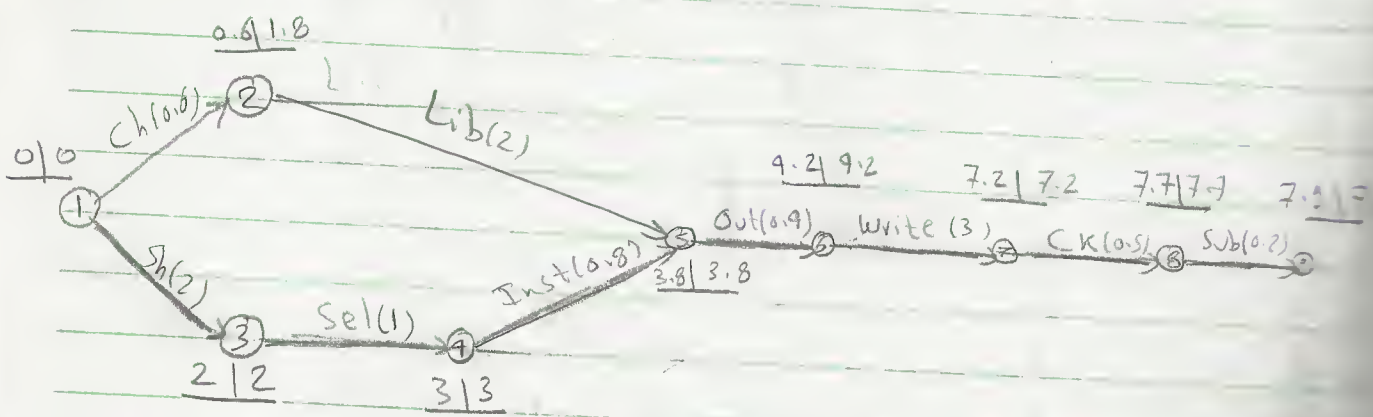
Activities could be delayed without delaying the early start of the following activities: C, H, K, P, S, T, D4 & D7

2) Assume there is another helping people help

(i) Activity | Duration (hrs) | Immediate predecessor

Activity	Duration (hrs)	Immediate predecessor
Inst	0.8	Sel
Out	0.4	Inst, Lib
Sub	0.2	CK
Ch	0.6	—
CK	0.5	Write
Write	3	Out
Sh	2	—
Sel	1	Sh
Lib	2	Ch

(ii)



Critical path: Sh – Sel – Inst – Out – Write – CK – Sub

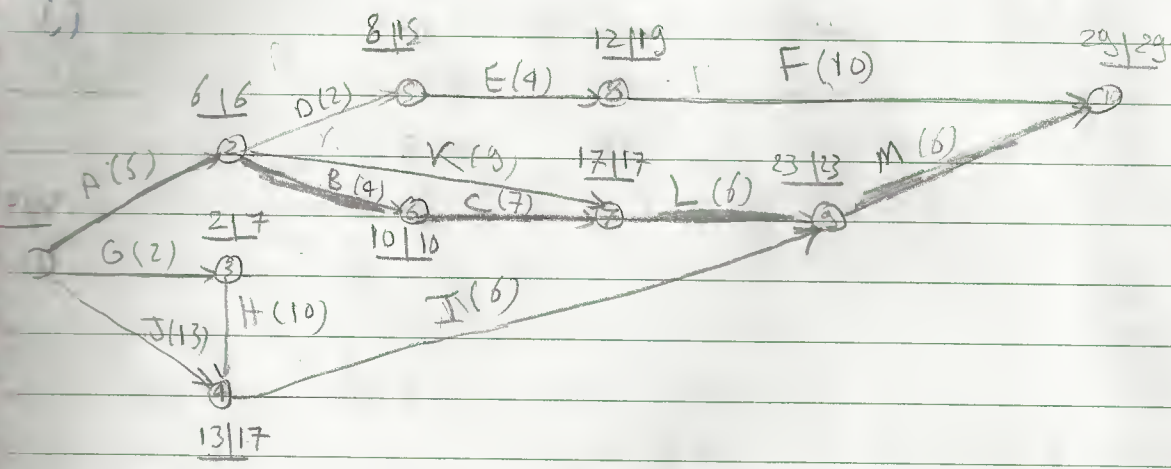
Expected duration time = 7.9 hrs

(iii) 1- Expected times aren't real especially activities on

2- Some activities can be mutually exclusive

3)

i)



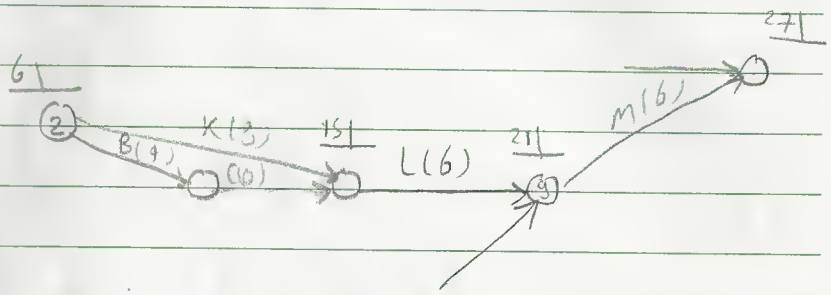
Earliest no. of weeks to introduce the product = 29 week

ii)

C) is a dummy

Period = 27 week

2 weeks are saved



iii) $FF_D = 8 - 6 - 2 = 0$ delay to not delay next activity (E)

$TF_D = 15 - 6 - 2 = 7$ delay to not delay the project

Time = $\min(FF_D, TF_D) = 0$

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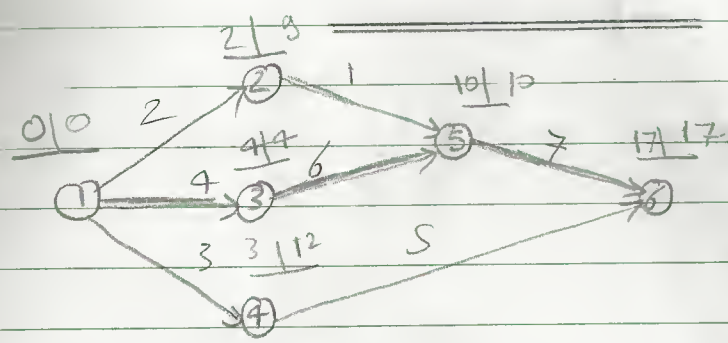
Assignment(2)



$$te = \frac{to + 4tm + tp}{6}$$

$$\sigma = \frac{tp - to}{6}$$

$$\sigma_{Path} = \sqrt{\sum_{i=1}^{n} \sigma_i^2}$$

Activity	to	tm	tp	te	σ	σ^2
1-2	1	1	7	2	1	1
1-3	1	4	7	4	1	1
1-4	2	2	8	3	1	1
2-5	1	1	1	1	0	0
3-5	2	5	14	6	2	4
4-6	2	5	8	5	1	1
5-6	3	6	15	7	2	4

Path	t_E	$t_{E\,acc.}$	σ^2	σ^2_{acc}	σ
1-2	2		1		
2-5	1	10	0	5	$\sqrt{5}$
5-6	7		4		
1-3	7	17	1		
3-5	14		4	9	3
5-6	15		4		
1-4	8	8	1		
4-6	8		1	2	$\sqrt{2}$

i) Expected completion time = 17 week

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(i) $x = 17 - 3 = 14$ week

$$z = \frac{x - \bar{x}}{\sigma} = \frac{14 - 17}{3} = -1$$

$P(z \leq -1) = 0.5 - 0.34134 = 0.15866 = 15.866\%$

(ii) $x = 17 + 3 = 20$ week

$$z = \frac{20 - 17}{3} = 1$$

$P(z \geq 1) = P(z \leq -1) = 0.15866$

(iv) $x = 18$

$$z = \frac{18 - 17}{3} = 0.33$$

$P(z \geq 0.33) = 0.5 - 0.12930 = 0.3703 = 37.03\%$

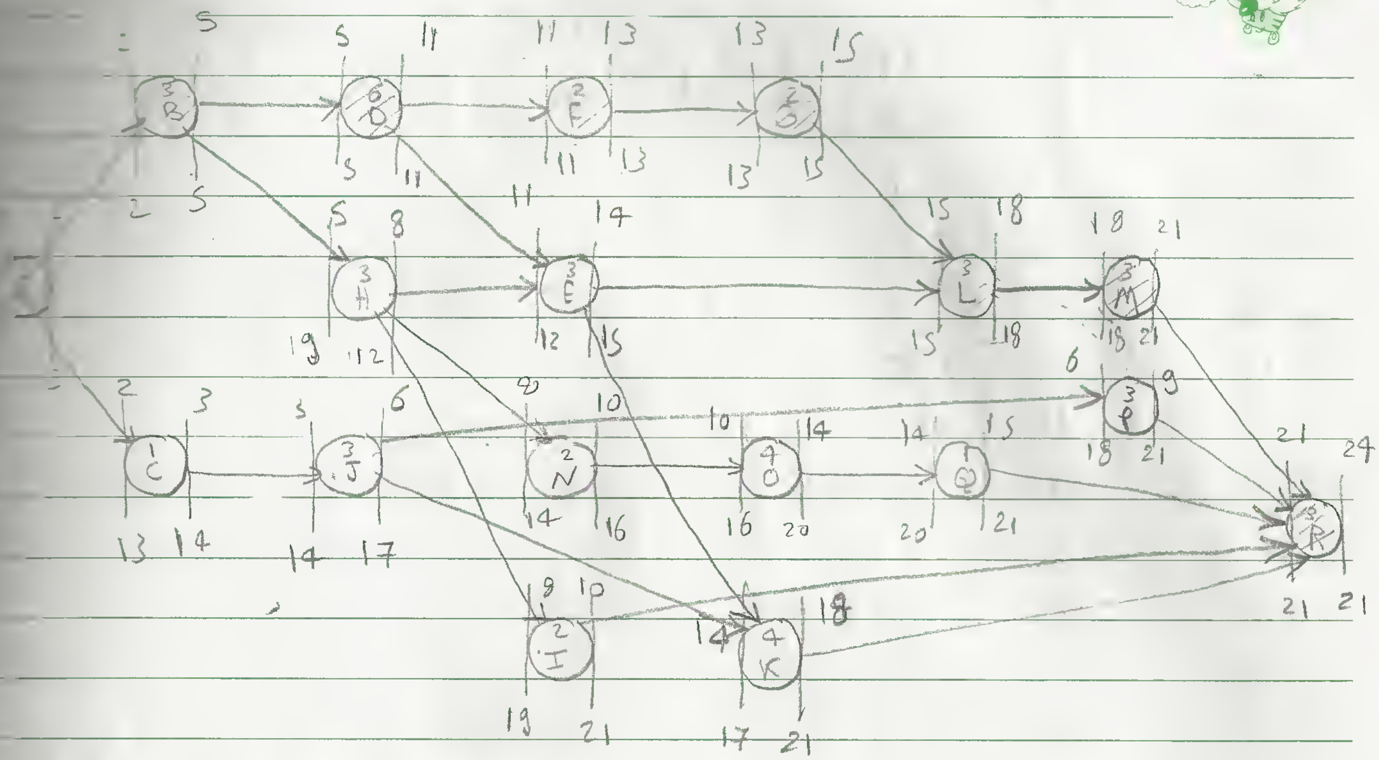
(v)

$P(z \leq A) = 0.9 = 0.5 + P(0 \leq z \leq A)$

$P(0 \leq z \leq A) = 0.4$

$$A = 1.28 = \frac{x - 17}{3}$$

$x = 20.84$ weeks =



Total completion time = 24 day
Critical path : A_B_D_F_G_L_M_R

Link	LAG
A_B	0
A_C	0
B_D	0
B_H	0
C_J	0
D_F	0
D_E	0
H_E	3
H_N	0
H_I	0

Link	LAG
J_P	0
J_K	8
F_G	0
E_L	1
E_K	0
N_O	10
I_R	11
G_L	0
O_Q	0
K_R	3

Link	LAG
L_M	0
Q_R	6
M_R	0
P_R	12

Activity	FF	TF
A	0	0
B	0	0
C	0	11
D	0	0
E	0	1
F	0	0
G	0	0
H	0	4
I	11	11
J	0	11
K	3	3
L	0	0
M	0	0
N	10	6
O	0	6
P	12	12
Q	6	6
R	0	0

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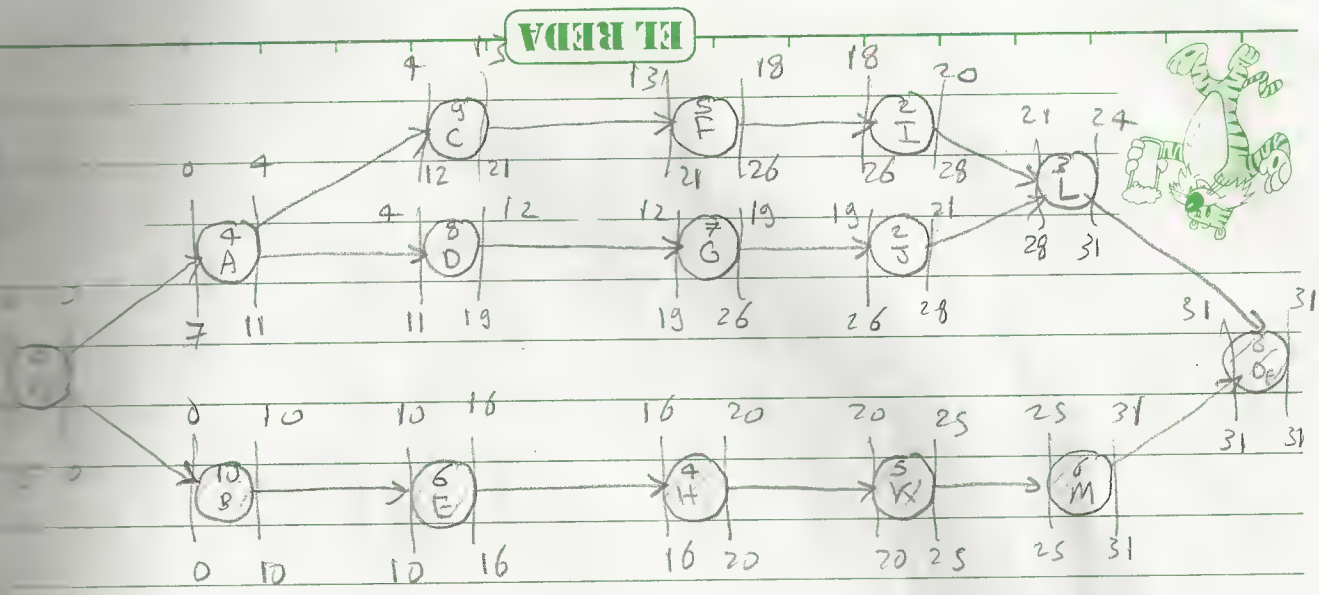
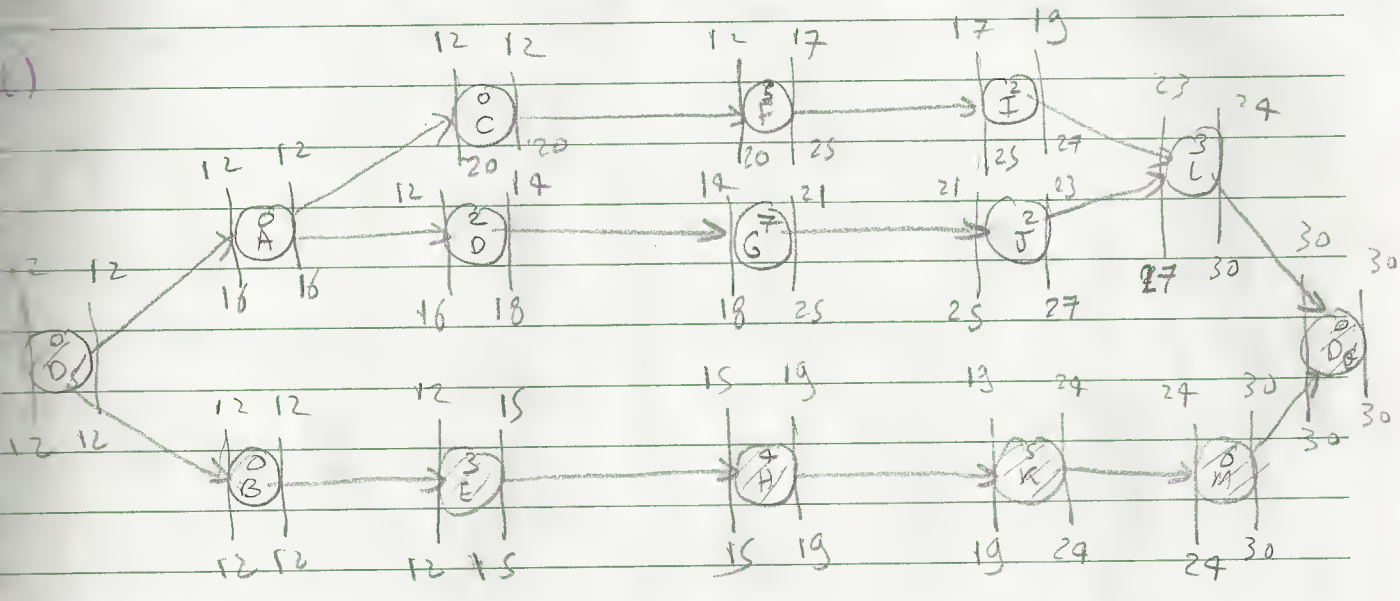


Total completion time = 31 weeks
Critical path : D_s - B - E - H - K - M - D_f

(b)



Total completion time = 30 weeks
Critical path : D_s - B - E - H - K - M - D_f

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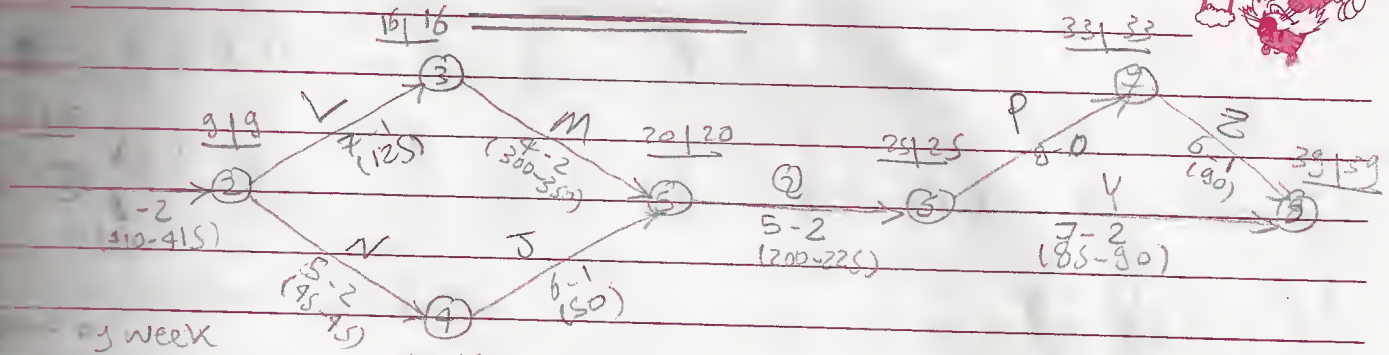
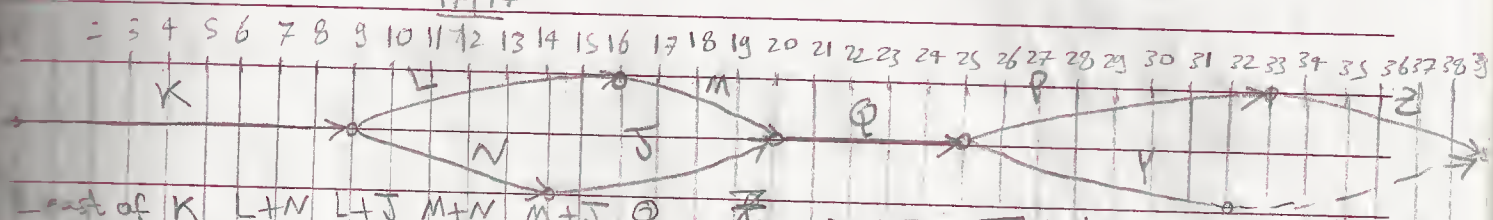
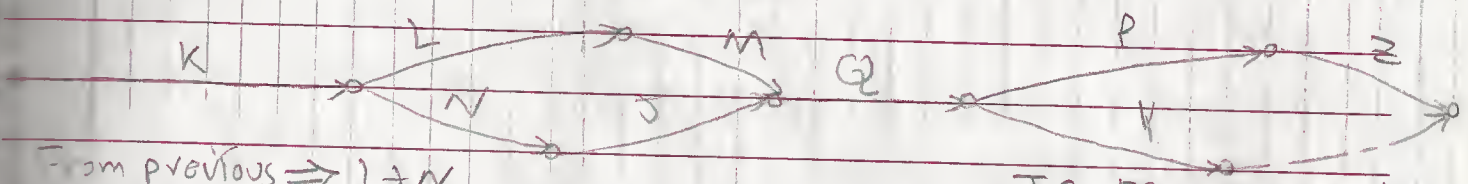
Sheet (3)



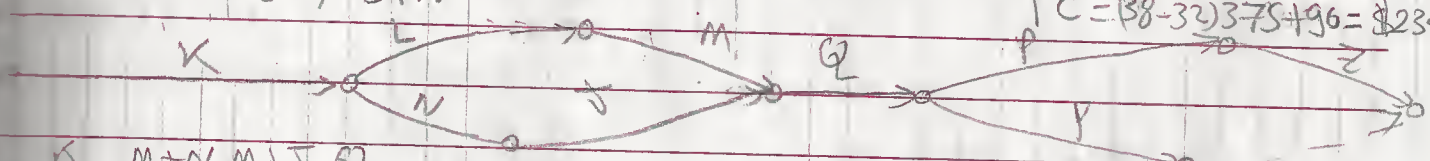
by week



cost of K L+N L+J M+N M+J Q Z
410 170 175 345 350 200 90 ⇒ Z TC=(39-32)375=$2625



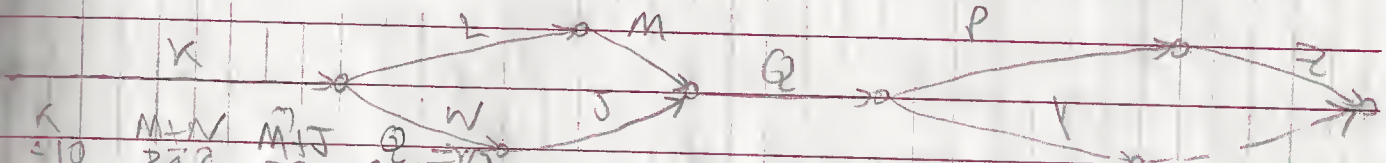
From previous ⇒ L+N



TC=(38-32)375+196=$2340

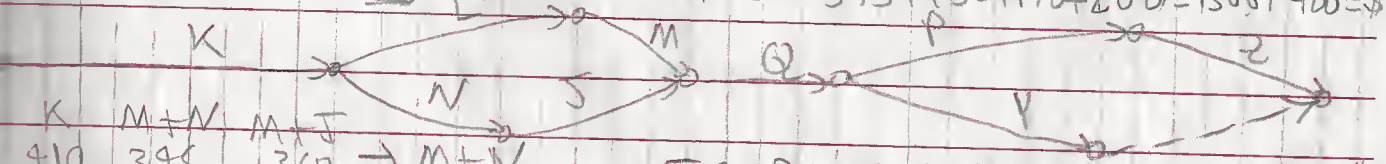
K M+N M+J Q ⇒ Q
410 345 350 200

TC=5×375+(90+170)=1875+260=$2135



K M+N M+J Q
410 345 350 225 ⇒ Q

TC=4×375+(90+170+200)=1500+460=$1980

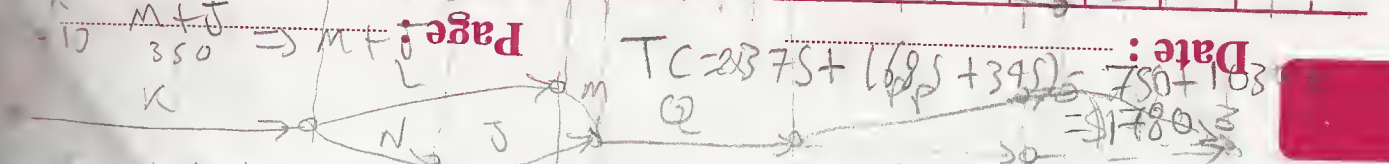


K M+N M+J
410 345 350 ⇒ M+N

TC=3×375+(460+225)=1125+685=$1810

M+J
350 ⇒ M+J

TC=2375+(685+345)=3750+1030=$1780



K ⇒ is to be crashed

TC=375+(1030+350)=$1755

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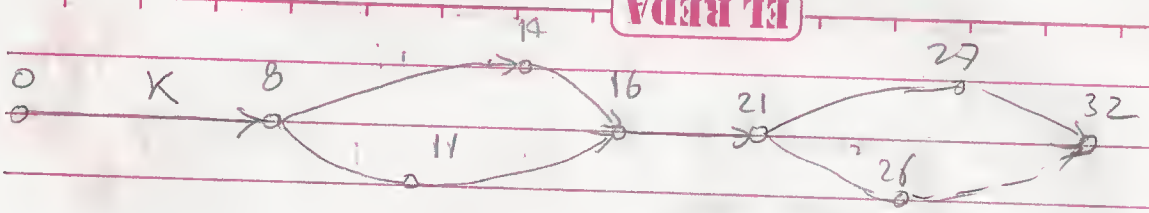
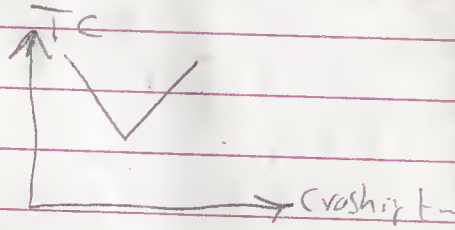


TC = 0 + 1380 + 910 + 1790 > 1785

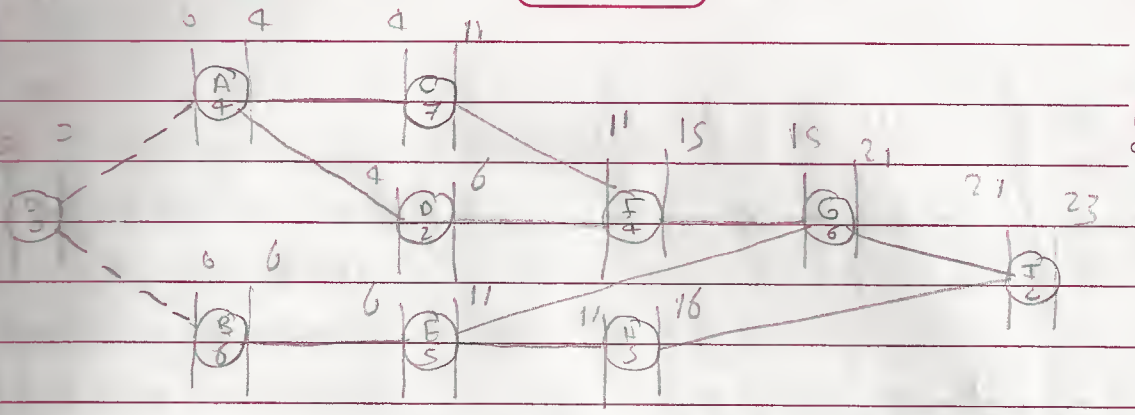
→ Crashing stops at 33 weeks

TC = $1780

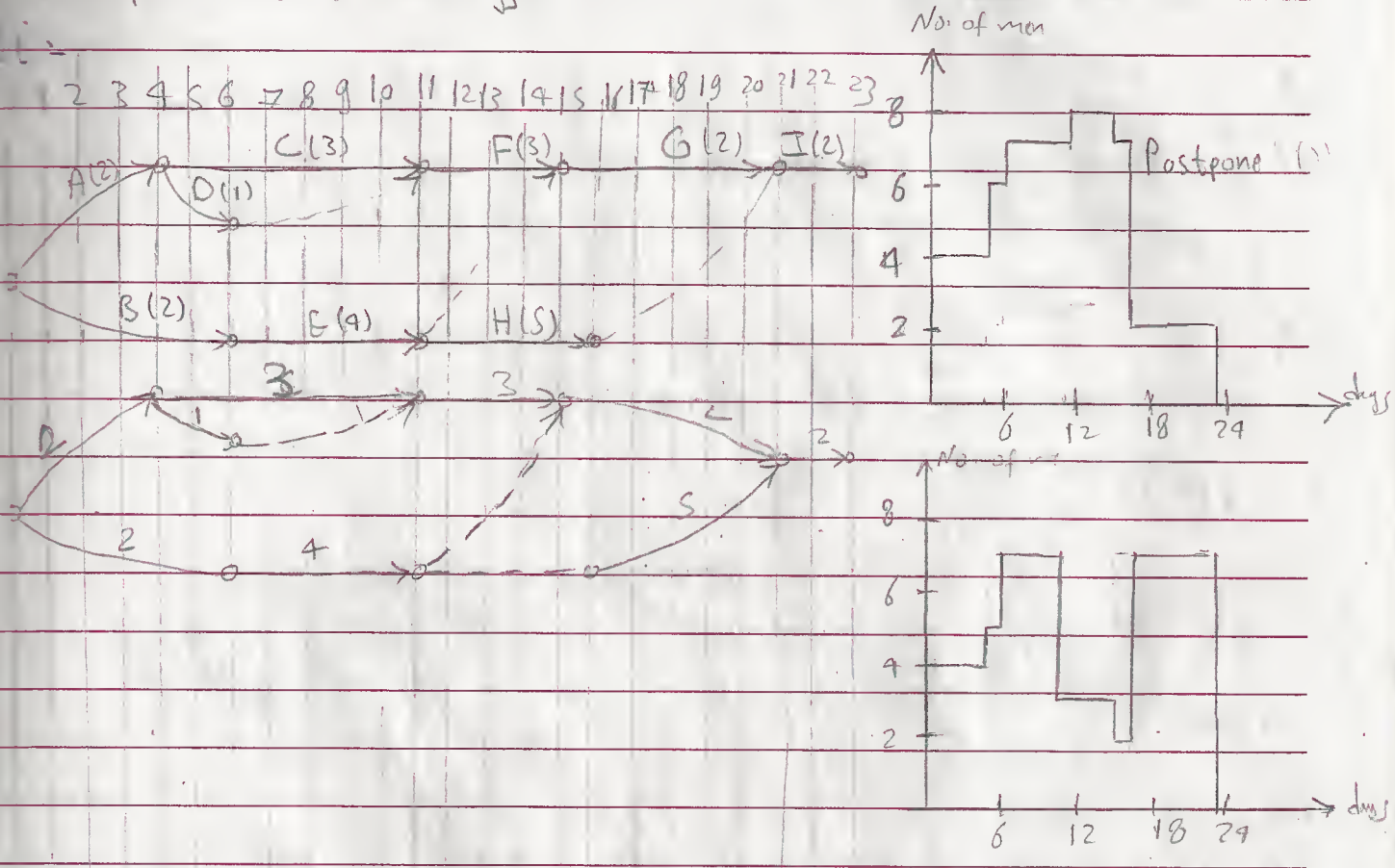


Crashing direction

Z → L + N → Q → Q → M + N → M + J



Completion time = 23 days



No. of men = 7 men

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Day 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23

Max. no. men = 5

(1-4) schedule 2 & 2

(5) continue 2 schedule 3 & 1

(6) Continue 2 & 3 and P. 4

(7) continue 3 & schedule 1 & 2

(8) continue 3 & 1

(9-11) continue 3 & P. 4

(12-16) schedule 4 & delay projects 5 & continue

(17-20) schedule 3

(21) schedule 2

22) schedule 2 & project 5

Days 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31

Date : .....

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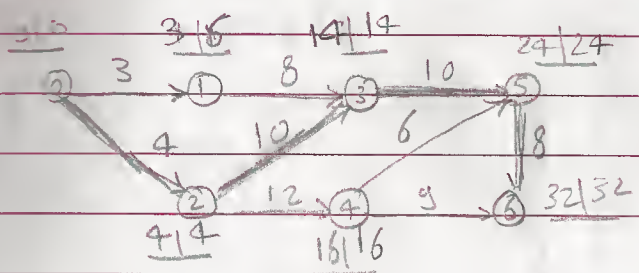
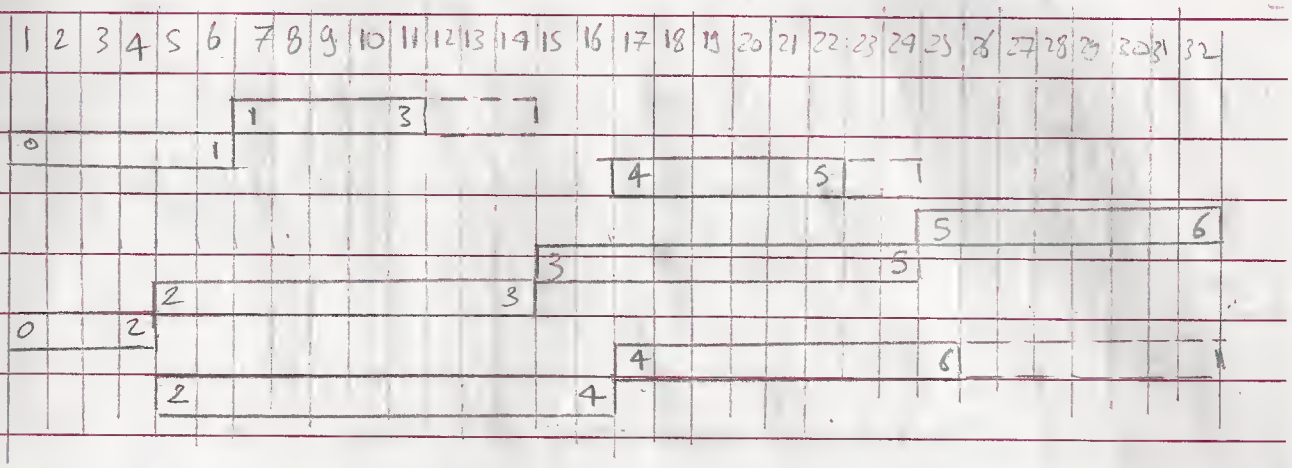
3)

1-

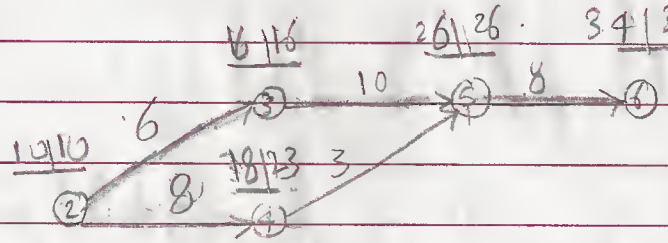


Completion time = 32 day

critical path: 0-2-3-5-6



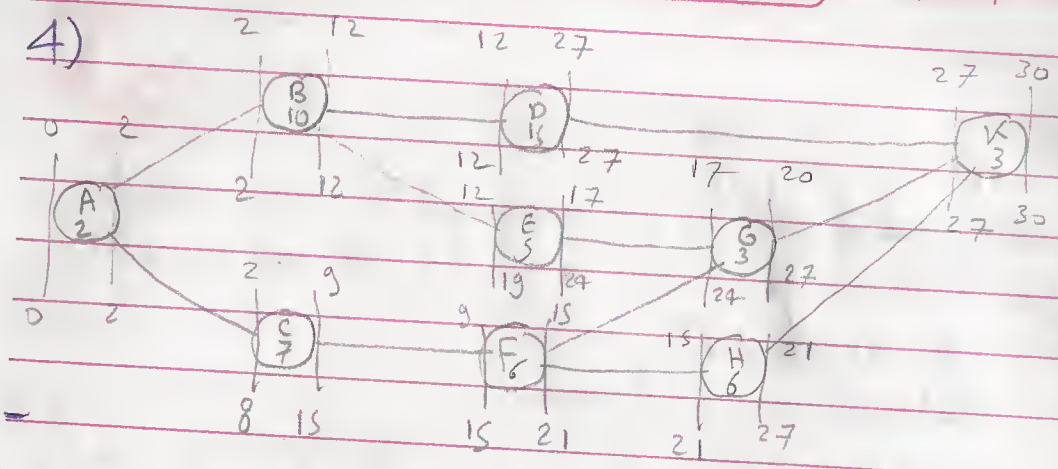
2-



Completion time=34 day

Effect of increase is more significant

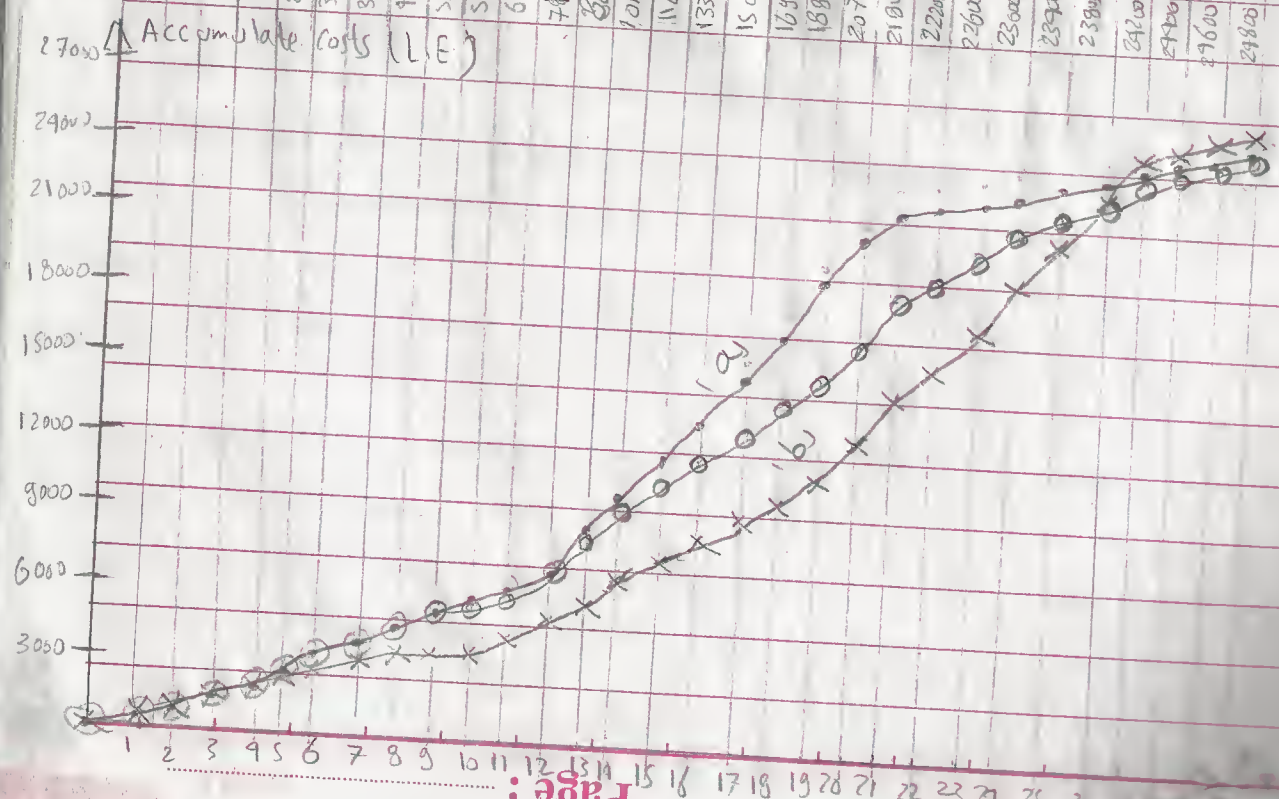
4)

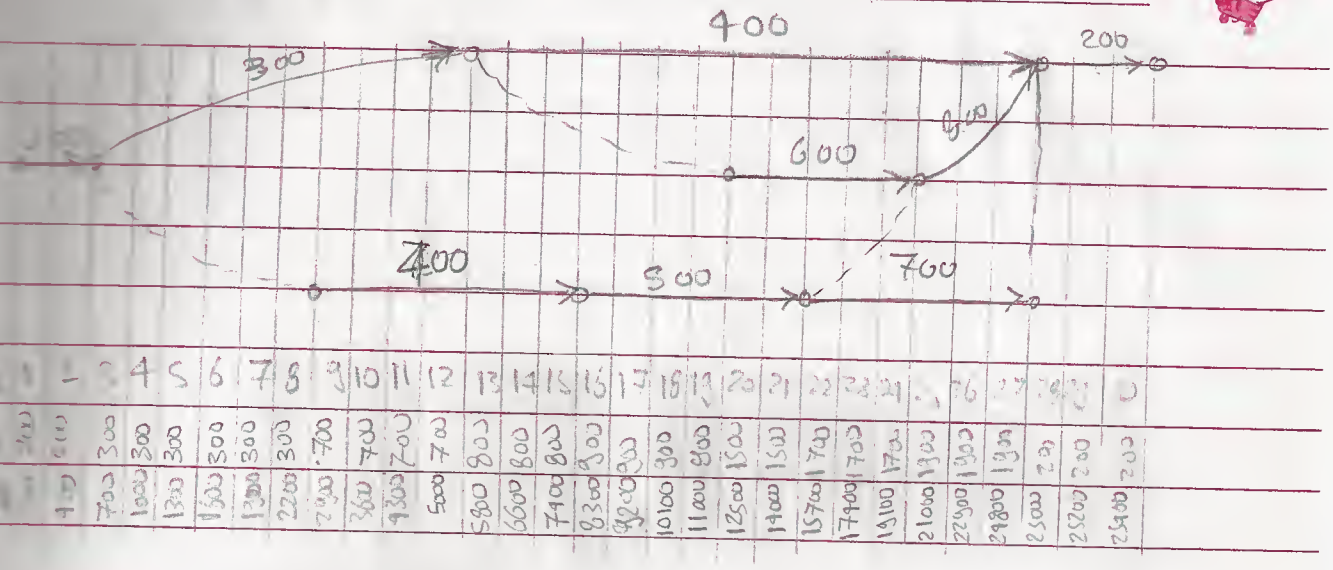


a =

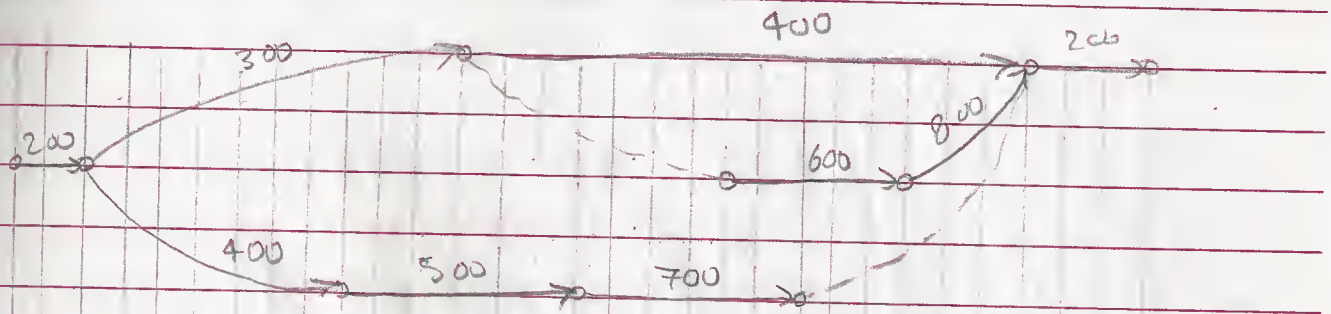
Day	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Costs	200	200	700	700	700	700	700	700	500	500	800	1500	1500	1700	1700	1300	1300	1300	1100	400	400	400	400	400	200	200	200			
Acc. costs	200	400	1100	1800	2500	3200	3900	4600	5300	5800	6300	7800	9300	11000	12700	14000	15300	16600	17900	19000	20400	21800	22200	22600	23000	23400	23800	24200	24600	24800

B (300)
D (400)
K (200)
A (200)
E (600)
G (800)
C (400)
F (500)
H (700)





Day	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Costs	200	200	700	700	700	700	700	700	800	800	800	800	900	900	900	1100	1100	1100	1100	1700	1700	1000	1000	1000	800	800	800	800	200	200
Acc. Costs	200	400	1100	1800	2500	3200	3900	4600	5300	6100	6900	7700	8600	9500	10400	11500	12600	13700	14800	16500	18200	19200	20200	21200	22000	22800	23600	24400	24600	24800



Day	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Costs	200	200	700	700	700	700	700	700	800	800	800	800	900	900	900	1100	1100	1100	1100	1700	1700	1000	1000	1000	800	800	800	800	200	200
Acc. Costs	200	400	1100	1800	2500	3200	3900	4600	5300	6100	6900	7700	8600	9500	10400	11500	12600	13700	14800	16500	18200	19200	20200	21200	22000	22800	23600	24400	24600	24800

d - Predicted → 6100
Real → 4800 [10 days]

↳ It acts as it is at end of day 8

End of day 20 ⇒ Acts as end of day 18

Acc. Costs = Acc. costs @ day 18 + Difference @ day 10 = 13,700 + (6100 - 4800)

= 15000 !

Date : .....

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